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DOCKET NUMBER: 206094US2PCT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF :
Stephen K. BARTON, et al.

SERIAL NUMBER: 09/807,959 : GROUP: 2631

FILED: June 14, 2001 : EXAMINER:

FOR: SYNCHRONIZING PULSE GENERATING METHOD AND METHOD OF RECEIVING OFDM SIGNAL

LETTER

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

On July 17, 2001 and March 18, 2002, we filed an Information Disclosure Statement. Submitted herewith is a Statement of Relevancy of the references filed with a copy of their respective Form 1449 for the Examiner's consideration.

Respectfully submitted,

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Form PTO 1449 (Modified)

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

LIST OF REFERENCES CITED BY APPLICANT

ATTY DOCKET NO.	SERIAL NO.
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U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE IF APPROPRIATE
	AA						
	AB						
	AC						
	AD						
	AE						
	AF						
	AG						
	AH						
	AI						
	AJ						
	AK						
	AL						
	AM						

Filed on July 17, 2001

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	TRANSLATION YES	TRANSLATION NO
	AN	10-190610	07/21/98	JAPAN		
	AO	10-308716	11/17/98	JAPAN		
	AP	0 730 357	09/04/96	EUROPE		
	AQ	0 998 068	05/03/2000	EUROPE		
	AR	2 307 155	05/14/97	GREAT BRITAIN		
	AS	2 306 084	04/23/97	GREAT BRITAIN		
	AT	0 955 754	11/10/99	EUROPE		
	AU	0 881 804	12/02/98	EUROPE		X
	AV	0 854 620	07/22/98	EUROPE		

OTHER REFERENCES (Including Author, Title, Date, Pertinent Pages, etc.)

	AW	A. PALIN, et al., Global Telecommunications Conference, Vol. 5, Pages 2788-2793, "ENHANCED SYMBOL SYNCHRONIZATION METHOD FOR OFDM SYSTEM IN SFN CHANNELS", November 8, 1998
	AX	
	AY	
	AZ	

Examiner	Date Considered

*Examiner: Initial if reference is considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

DOCKET NO: 206694US2PCT Sheet 1 of 4

SERIAL NO: 09/807,959 Group Art Unit: 2631

STATEMENT OF RELEVANCY
(of references filed on July 17, 2001)

Reference AN (JP 10-190610) on Form 1449:

This shows a system which correlates over the guard interval and detects the peak, and uses this for clock recovery and timing control. The solutions of the present invention are not disclosed.

Reference AO (JP 10-308716) on Form 1449:

The disclosed algorithm calculates a correlation, takes a moving average of this, then looks for a maximum value. The moving average is derived from a window which is varied to obtain a unique peak (Figure 3(D)); a sub-interval of maximum correlation is not detected.

Reference AP (EP 0 730 357) on Form 1449:

The disclosed algorithm calculates a correlation, takes a moving average of this, then looks for a maximum value. There is no mention of a sub-interval as in the present invention, and the moving average is based on a window equal to the guard interval, thus indicating that sub-intervals of maximum correlation cannot be detected. There appear to be no thresholds which have to be exceeded before adjusting the synchronisation pulse, as set out in claims 12 and 13 of the present application.

Reference AQ (EP 0 998 068) on Form 1449:

This reference is similar to reference AO (JP 10-308716).

Reference AR (GB 2 307 155) on Form 1449:

This reference describes multi-path interference considerations, but does not suggest the solutions of the present application.

STATEMENT OF RELEVANCY

(Cont. of references filed on July 17, 2001)

Reference AS (GB 2 306 084) on Form 1449:

This describes correlation over the whole of an OFDM symbol for determining the channel characteristic. The solutions of the present invention are not suggested.

Reference AT (EP 0 955 754) on Form 1449:

This describes using two correlators in series. The first correlator output is delayed and then recorrelated with the undelayed version in a second correlator so producing a more distinct synchronization pulse. Each correlator uses a sliding window having a size equal to the guard interval, which would thus obscure the sub-interval of greatest correlation, as in the prior art. This therefore represents a different solution; the solutions of the present invention are not suggested.

Reference AU (EP 0 881 804) on Form 1449:

This describes varying the position in time of two 'windows' of data, i.e. two sets of contiguous samples, with a given number of samples in each set. The two windows are offset in time with respect to one another. The positions of the windows with respect to the OFDM symbol is varied, and correlators detect when the correlation between the samples in the two windows is significant and sets a flag if the result of the correlation is greater than a particular set threshold. The position of the windows is then varied until the correlation is maximum. At this point, the location of the guard period is determined.

There is, however, no suggestion of any technique whereby a position of maximum correlation, occupying a sub-interval of the guard period, can be determined. The described threshold will be exceeded wherever samples of equal value are correlated, and will not distinguish between varying levels of correlation within the guard interval. Fine control of the timing of the synchronisation pulse would not therefore be achieved.

STATEMENT OF RELEVANCY

(Cont. of references filed on July 17, 2001)

Reference AV (EP 0 854 620) on Form 1449:

To reduce complexity and increase speed, the correlator operates in only part of the guard interval. However, the output is integrated as in the prior art (see Figure 6F) so the synchronisation pulse would be issued at a unique point, corresponding to the end of the correlated part of the guard interval, irrespective of varying levels of correlation due to multi-path interference.

This document also shows the use of a threshold, but this is just to avoid noise, and the actual synchronisation signal is generated by peak detection.

Reference AW (Paper entitled "Enhances synchronization method for OFDM system in SFN channels" A. Palin, J. Rinne) on Form 1449:

This reference corresponds to reference AT (EP 0 955 754).

Form PTO 1449 (Modified) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

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FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	TRANSLATION YES	TRANSLATION NO
	AO	0 689 313	12/27/95	EUROPE		
	AP	0 837 582	04/22/98	EUROPE		
	AQ	0 798 903	10/01/97	EUROPE		
	AR	WO 99/12305	03/11/99	WIPO		
	AS					
	AT					
	AU					
	AV					

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SERIAL NO: 09/807,959 Group Art Unit: 2631

STATEMENT OF RELEVANCY

(of references filed on March 18 2002)

Reference AO (EP 0 689 313) on Form 1449:

This relates to signals which do not have guard intervals and therefore don't comply with the language used in claim 1. Furthermore, the method does not determine the degree of correlation between samples which are separated by a period corresponding to the useful part of the signal. The timing of the signal is generated following a cross correlation operation (between a special symbol and a symbol from a memory). As indicated in Figure 10, the timing signal could be generated at a time of maximum correlation, using a threshold. However, there appears to be no provision for distinguishing between different levels of correlation within a high-level correlation period.

Reference AP (EP 0 837 582) on Form 1449:

This describes a system in which a synchronisation pulse is produced in response to calculation of impulse responses of a transmission path on the basis of a Fourier transformation output (i.e. in the frequency domain) at different positions of a window, and selecting the window position where the maximum energy is obtained. The synchronisation pulse is not generated by detecting a sub-interval of maximum correlation within a high-correlation period.

Reference AQ (EP 0 798 903) on Form 1449:

The symbol timing determination circuit 40, which generates the synchronization pulse, seems to operate in a standard way (see page 5, lines 29 to 32, and Figs. 15A to 15C)..

Reference AR (WO 99/12305) on Form 1449:

This describes a technique whereby the synchronisation pulse is determined by a cross-correlation operation based on samples separated by the useful part of the symbol period. However, instead of cross-correlating the samples themselves, the prior art cross-correlates values representing the phase differences between successive samples. The synchronisation pulse is generated using a slide window adder 226. There is no suggestion that this should have a size substantially less than that of the guard interval, and consequently no reason to suppose that the system can detect a maximum-correlation sub-interval within the guard interval. The maximum output of the adder 226 would presumably be reached at the end of the high-correlation period, as in the prior art.